SIPMOS® Small-Signal-Transistor

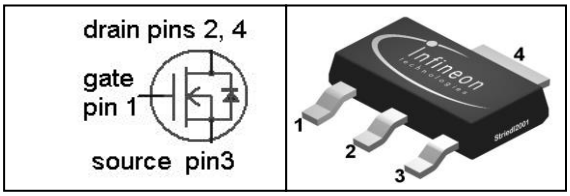
Features

- N-channel
- Depletion mode
- d*v*/d*t* rated
- Available with $V_{GS(th)}$ indicator on reel
- Pb-free lead plating; RoHS compliant
- Qualified according to AEC Q101
- Halogen-free according to IEC61249-2-21

Product Summary

V_{DS}	400	V
$R_{DS(on),max}$	24	Ω
$I_{DSS,min}$	40	mA

PG-SOT223



Type	Package	Tape and Reel	Marking	Halogen-	Packaging
BSP179	PG-SOT223	H6327: 1000 pcs/reel	BSP179	Yes	Non dry
BSP179	PG-SOT223	H6906: 1000 pcs/reel sorted in $V_{GS(th)}$ bands[1)]	BSP179	Yes	Non dry

Maximum ratings, at T_j=25 °C, unless otherwise specified

Parameter	Symbol	Conditions	Value	Unit
Continuous drain current	I_D	T_A=25 °C	0.21	A
		T_A=70 °C	0.17	
Pulsed drain current	$I_{D,pulse}$	T_A=25 °C	0.83	
Reverse diode d*v*/d*t*	d*v*/d*t*	I_D=0.21 A, V_{DS}=20 V, d*i*/d*t*=200 A/µs, $T_{j,max}$=150 °C	6	kV/µs
Gate source voltage	V_{GS}		±20	V
ESD sensitivity (HBM) as per JESD-A114-HBM			1A (>250V, <500V)	
Power dissipation	P_{tot}	T_A=25 °C	1.8	W
Operating and storage temperature	T_j, T_{stg}		-55 ... 150	°C
IEC climatic category; DIN IEC 68-1			55/150/56	

[1)] see table on next page and diagram 11

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Thermal characteristics						
Thermal resistance, junction - soldering point (pin 4)	R_{thJS}		-	-	25	K/W
SMD version, device on PCB	R_{thJA}	minimal footprint	-	-	115	
		6 cm^2 cooling area[2)]	-	-	70	

Electrical characteristics, at T_j=25 °C, unless otherwise specified

Static characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS}=-3 V, I_D=250 µA	400	-	-	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=3 V, I_D=94 µA	-2.1	-1.4	-1	
Drain-source cutoff current	$I_{D(off)}$	V_{DS}=400 V, V_{GS}=-3 V, T_j=25 °C	-	-	0.1	µA
		V_{DS}=400 V, V_{GS}=-3 V, T_j=150 °C	-	-	10	
Gate-source leakage current	I_{GSS}	V_{GS}=20 V, V_{DS}=0 V	-	-	100	nA
On-state drain current	I_{DSS}	V_{GS}=0 V, V_{DS}=10 V	40	-	-	mA
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS}=0 V, I_D=0.01 A	-	18	24	Ω
		V_{GS}=10 V, I_D=0.21 A	-	13	18	
Transconductance	g_{fs}	$\|V_{DS}\|>2\|I_D\|R_{DS(on)max}$, I_D=0.17 A		0.21	-	S
Threshold voltage $V_{GS(th)}$ sorted in bands[3)]						
J	$V_{GS(th)}$	V_{DS}=3 V, I_D=94 µA	-1.2	-	-1	V
K			-1.35	-	-1.15	
L			-1.5	-	-1.30	
M			-1.65	-	-1.45	
N			-1.8	-	-1.6	

[2)] Device on 40 mm x 40 mm x 1.5 mm epoxy PCB FR4 with 6 cm^2 (single layer, 70 µm thick) copper area for drain connection. PCB is vertical in still air.

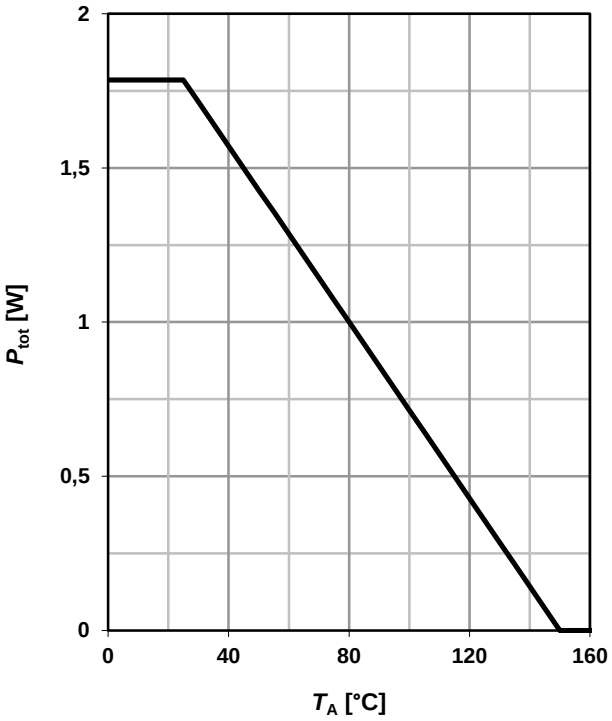
[3)] Each reel contains transistors out of one band whose identifying letter is printed on the reel label. A specific band cannot be ordered separately.

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Dynamic characteristics[4]						
Input capacitance	C_{iss}	V_{GS}=-3 V, V_{DS}=25 V, f=1 MHz	-	102	135	pF
Output capacitance	C_{oss}		-	10	14	
Reverse transfer capacitance	C_{rss}		-	6	9	
Turn-on delay time	$t_{d(on)}$	V_{DD}=200 V, V_{GS}=-3...5 V, I_D=0.2 A, $R_{G,ext}$=25 Ω	-	6.1	9.2	ns
Rise time	t_r		-	8.8	13.1	
Turn-off delay time	$t_{d(off)}$		-	17	25	
Fall time	t_f		-	68	102	
Gate Charge Characteristics[4]						
Gate to source charge	Q_{gs}	V_{DD}=400 V, I_D=0.21 A, V_{GS}=-3 to 5 V	-	0.43	0.65	nC
Gate to drain charge	Q_{gd}		-	2.2	3.3	
Gate charge total	Q_g		-	4.5	6.8	
Gate plateau voltage	$V_{plateau}$		-	0.49	-	V
Reverse Diode						
Diode continous forward current	I_S	T_A=25 °C	-	-	0.21	A
Diode pulse current	$I_{S,pulse}$		-	-	0.83	
Diode forward voltage	V_{SD}	V_{GS}=-3 V, I_F=0.21 A, T_j=25 °C	-	0.84	1.1	V
Reverse recovery time[4]	t_{rr}	V_R=200 V, I_F=0.21 A, di_F/dt=100 A/µs	-	111	167	ns
Reverse recovery charge[4]	Q_{rr}		-	390	584	nC

[4] Defined by design. Not subjected to production test

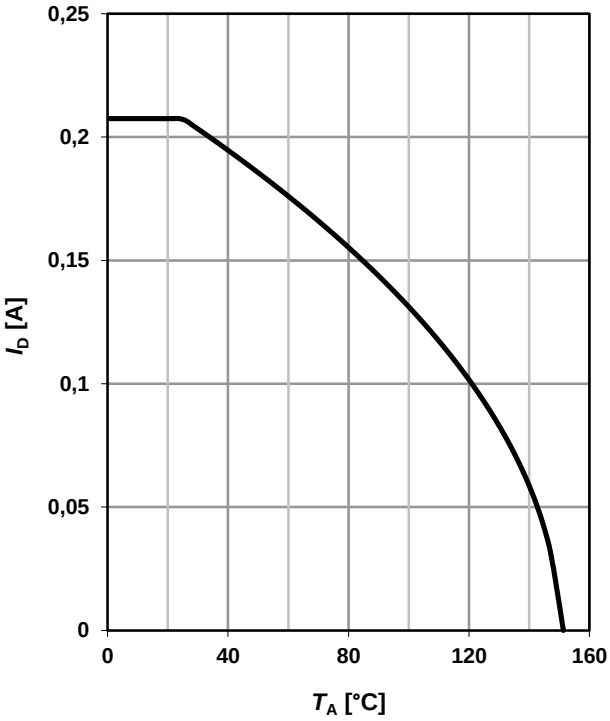
1 Power dissipation

$P_{tot)}$=f(T_A)



2 Drain current

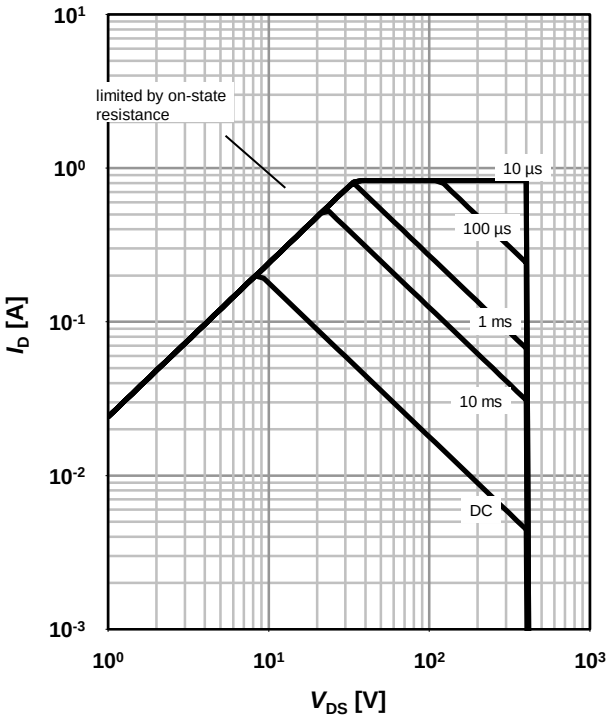
I_D=f(T_A); V_{GS}≥10 V



3 Safe operating area

I_D=f(V_{DS}); T_A=25 °C; D=0

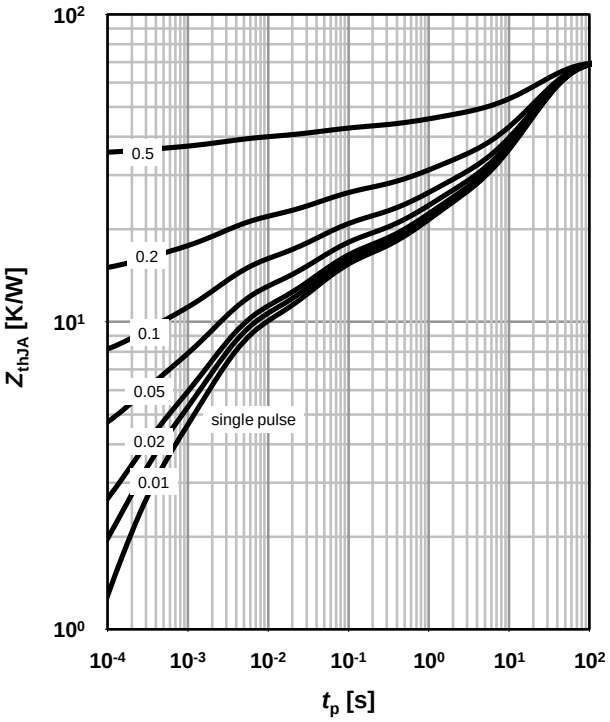
parameter: t_p



4 Max. transient thermal impedance

Z_{thJA}=f(t_p)

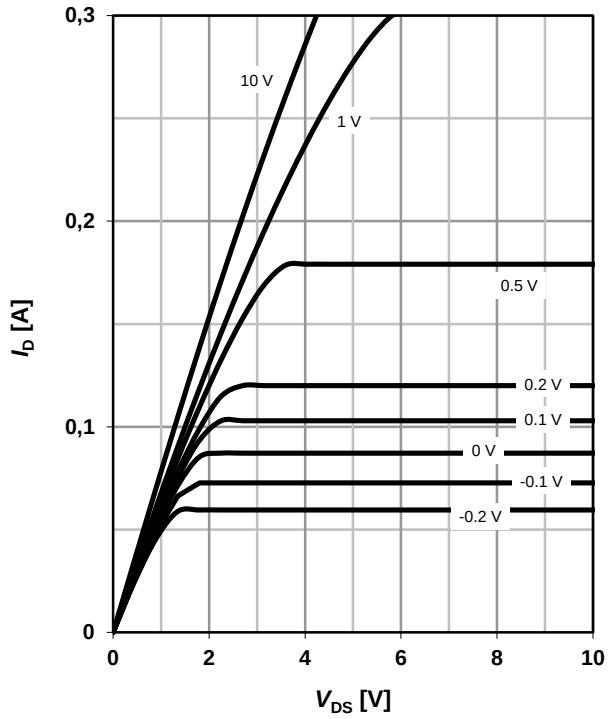
parameter: D=t_p/T



5 Typ. output characteristics

I_D=f(V_{DS}); T_j=25 °C

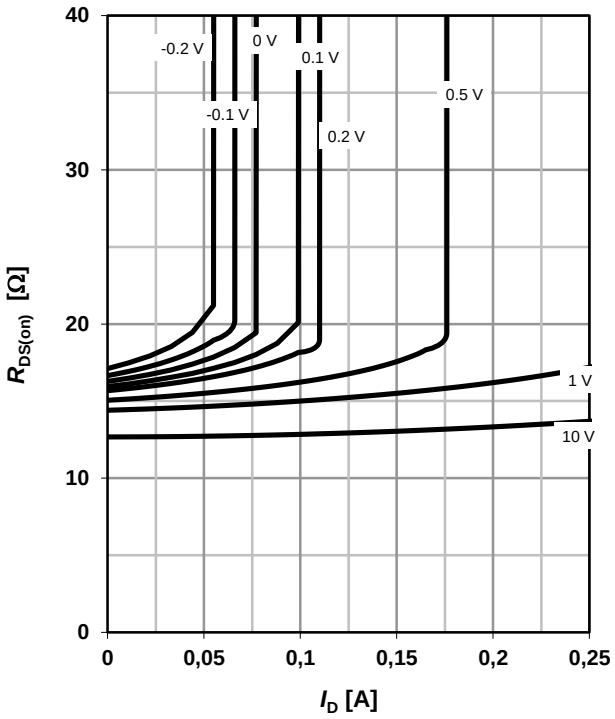
parameter: V_{GS}



6 Typ. drain-source on resistance

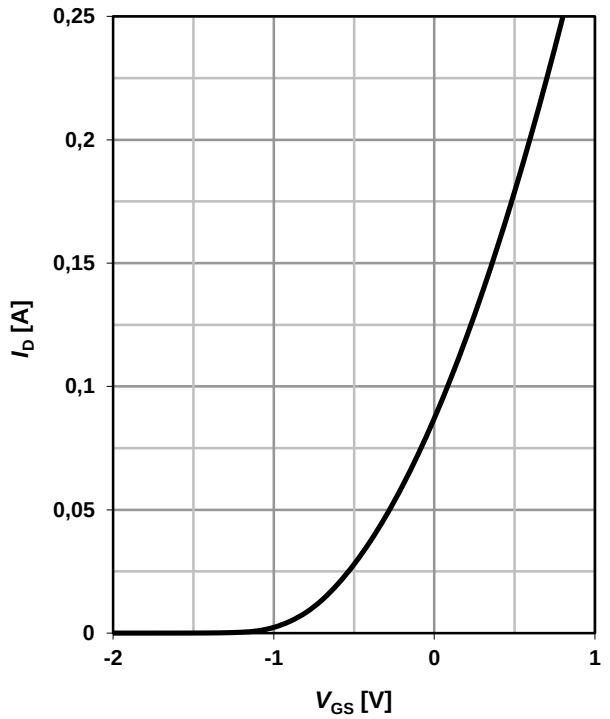
$R_{DS(on)}$=f(I_D); T_j=25 °C

parameter: V_{GS}



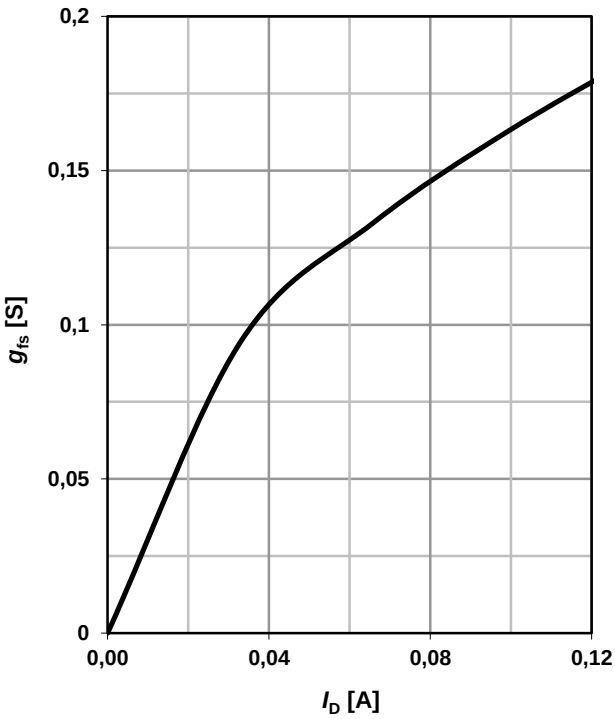
7 Typ. transfer characteristics

I_D=f(V_{GS}); $|V_{DS}|>2|I_D|R_{DS(on)max}$



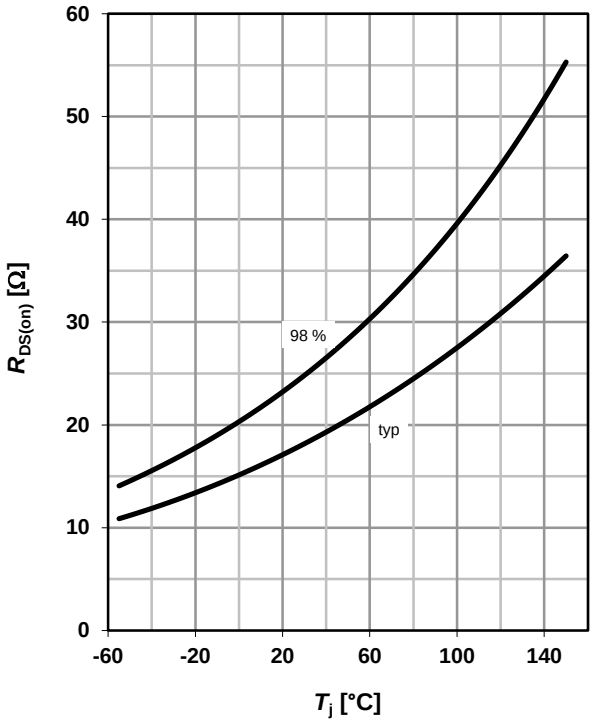
8 Typ. forward transconductance

g_{fs}=f(I_D); T_j=25 °C



9 Drain-source on-state resistance

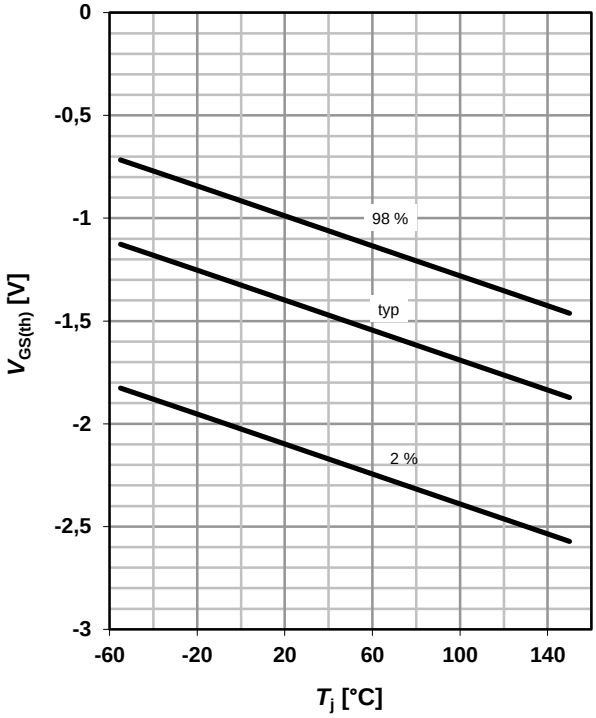
$R_{DS(on)}$=f(T_j); I_D=0.01 A; V_{GS}=0 V



10 Typ. gate threshold voltage

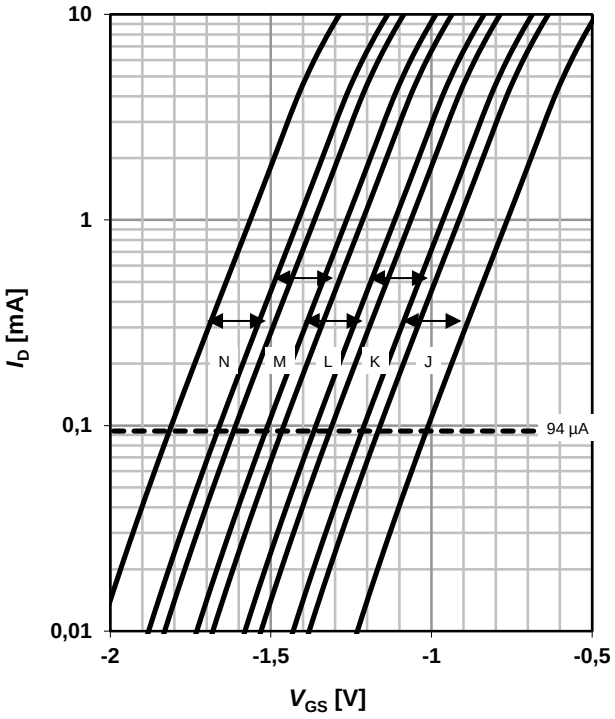
$V_{GS(th)}$=f(T_j); V_{DS}=3 V; I_D=94 µA

parameter: I_D



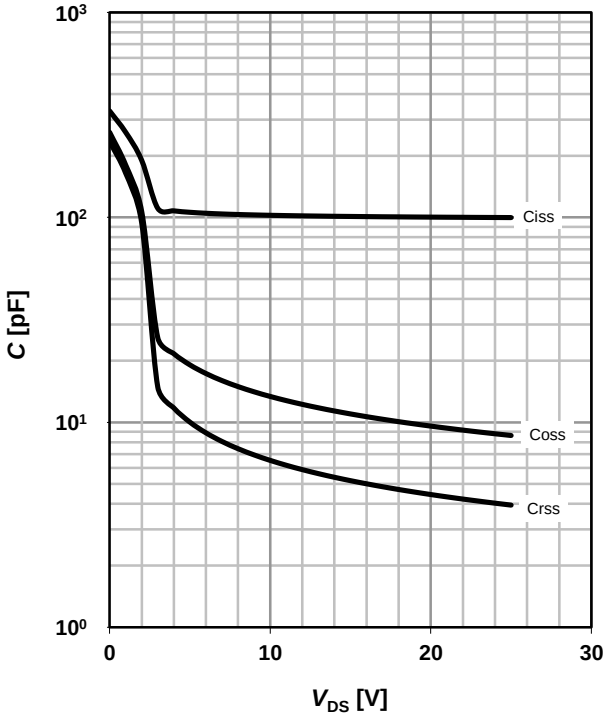
11 Threshold voltage bands

I_D=f(V_{GS}); V_{DS}=3 V; T_j=25 °C



12 Typ. capacitances

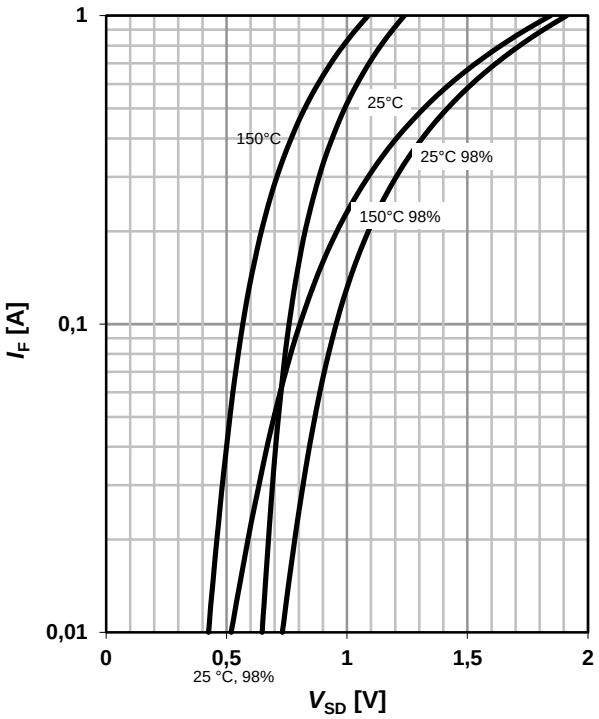
C=f(V_{DS}); V_{GS}=-3 V; f=1 MHz



13 Forward characteristics of reverse diode

I_F=f(V_{SD})

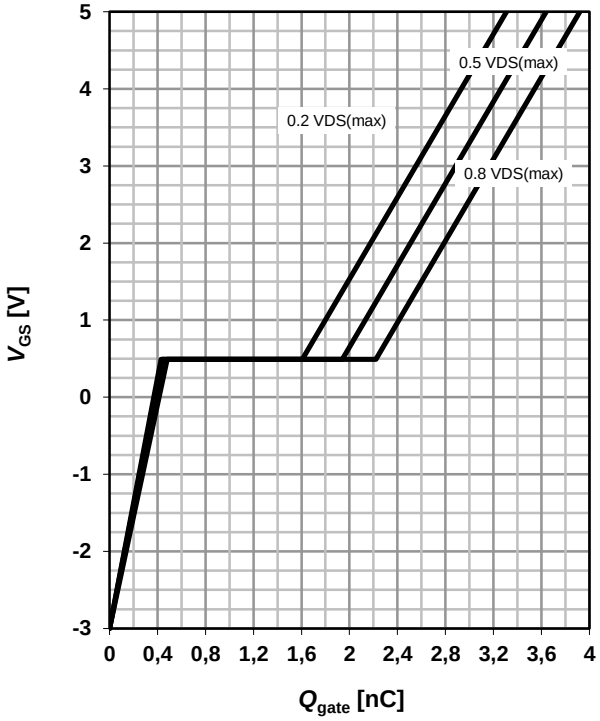
parameter: T_j



15 Typ. gate charge

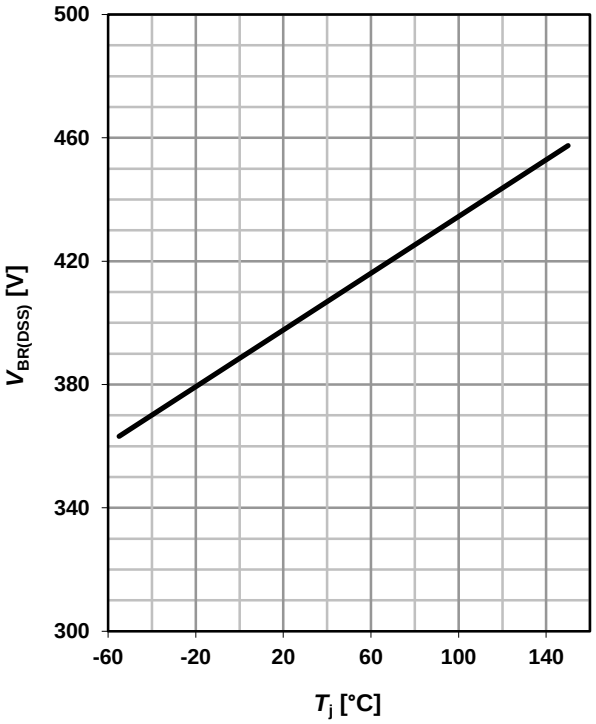
V_{GS}=f(Q_{gate}); I_D=0.21 A pulsed

parameter: V_{DD}

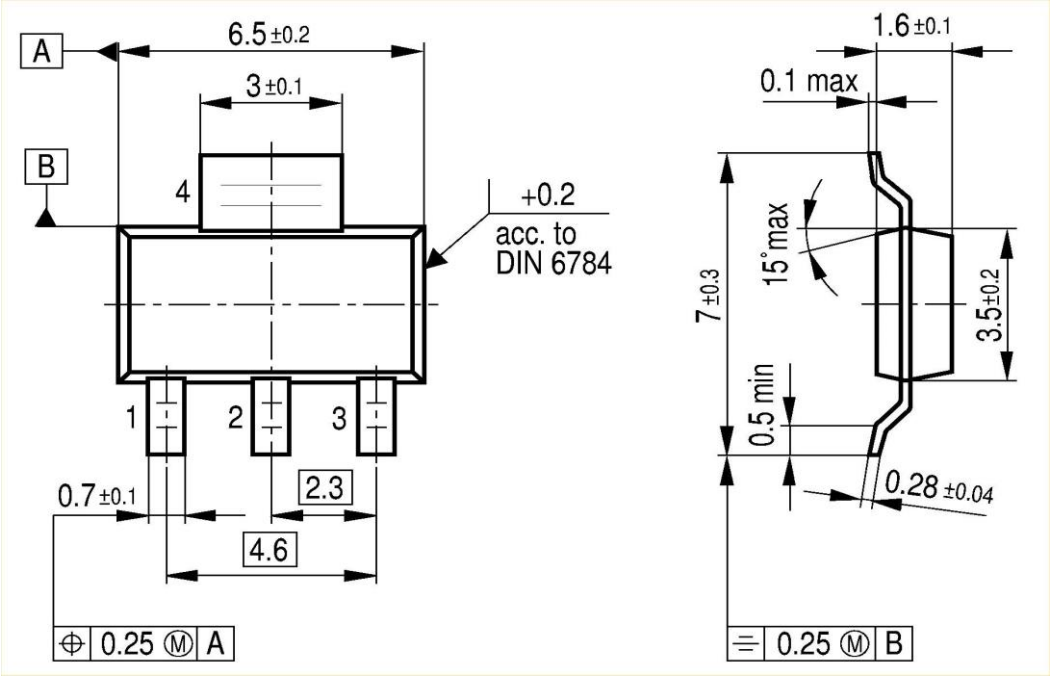


16 Drain-source breakdown voltage

$V_{BR(DSS)}$=f(T_j); I_D=250 µA

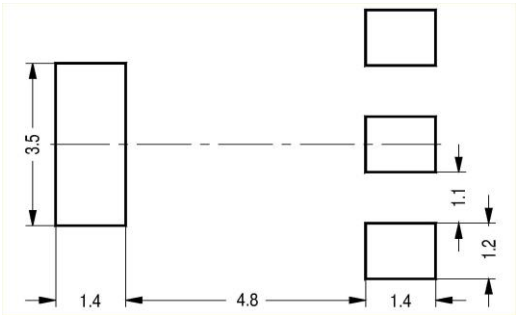


Package Outline:

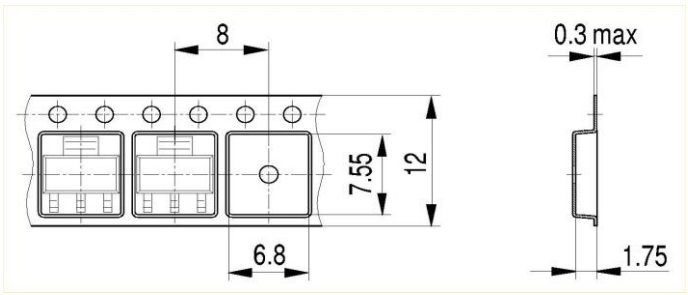


9.18
13.14
24.96
102.48

Footprint:



Packaging:



Dimensions in mm